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Committee on the Peaceful Uses of Outer Space

Report of the Expert on Space Applications*

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* It was necessary to summarize in the report each of the activities organized under the United Nations Programme on Space Applications, the last of which was concluded on 30 November 2000.

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I. Introduction

1. At its thirty-seventh session, in 2000, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space reviewed the activities of the United Nations Programme on Space Applications. The Subcommittee noted that the 1999 activities of the Programme had been carried out satisfactorily. Upon the recommendation of the Committee, the activities scheduled for 2000 had been endorsed by the General Assembly in its resolution 54/67 of 6 December 1999.

2. The Subcommittee recommended to the Committee, for its approval, the activities scheduled for 2001 under the regular budget, and took note of other activities of the Programme, all of which were to be implemented as part of those recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) related to space applications, as proposed by the Expert on Space Applications in his report (A/AC.105/730) submitted to the Scientific and Technical Subcommittee at its thirty-seventh session, in 2000. Summaries of the activities carried out within the framework of the Programme in 2000 and those scheduled for implementation in 2001 are presented in annexes I and II. The activities proposed for 2002 are presented below.

II. Mandate of the United Nations Programme on Space Applications

3. The General Assembly, in its resolution 37/90 of 10 December 1982, expanded the mandate of the United Nations Programme on Space Applications to include, in particular, the following elements:

(a) Promotion of greater exchange of actual experiences with specific applications;

(b) Promotion of greater cooperation in space science and technology between developed and developing countries as well as among developing countries;

(c) Development of a fellowship programme for in-depth training of space technologists and applications specialists;

(d) Organization of seminars on advanced space applications and new system developments for managers and leaders of space application and technology development activities as well as seminars for users in specific applications;

(e) Stimulation of the growth of indigenous nuclei and an autonomous technological base, in cooperation with other United Nations organizations and/or States Members of the United Nations or members of the specialized agencies;

(f) Dissemination of information on new and advanced technology and applications;

(g) Provision or arrangements for provision of technical advisory services on space applications projects, upon request by Member States or any of the specialized agencies.

4. In its resolution 55/122 of 8 December 2000, the General Assembly noted that the Office for Outer Space Affairs of the Secretariat had submitted to the Committee for its review at its forty-third session a plan of action to implement the recommendations of UNISPACE III.[1] That plan of action contained a number of activities to be carried out under the Programme. In the same resolution, the Assembly requested the Secretary-General to begin implementing those measures and activities contained in the plan of action and currently within the programme of work of the Office for Outer Space Affairs and to ensure the full implementation of the plan with necessary resources in 2002. The activities to be carried out in 2001 and those proposed for 2002 under the Programme are in accordance with that request by the Assembly.

III. Orientation of the Programme

5. The United Nations Programme on Space Applications will be aimed at further promoting, through international cooperation, the use of space technologies and data for sustainable economic and social development in developing countries by raising the awareness of decision makers of the cost-effectiveness and additional benefits to be obtained; establishing or strengthening the capacity in developing countries to use space technology; and

strengthening outreach activities to disseminate awareness of the benefits obtained.

6. The overall strategy of the Programme is to identify a few major themes with near- and mid-term objectives on which to concentrate initially. For each theme, individual activities will build on the results of previous activities aimed at achieving concrete results in a period of 1-3 years. The priority themes that have been identified within the framework of the Programme are as follows: (a) disaster management; (b) tele-education and telemedicine; (c) protection of the environment; (d) management of natural resources; (e) small satellites for research and applications; and (f) use of global navigation and positioning satellite systems in remote sensing applications strategic to development activities.

7. In particular, the Programme will focus its efforts to support the actions agreed upon by the Committee and its Scientific and Technical Subcommittee to implement the recommendations of UNISPACE III.

8. The activities of the Programme will concentrate on:

(a) Providing support for education and training for capacity-building in developing countries through the regional centres for space science and technology education and the Network of Space Science and Technology Education and Research Institutions for Central Eastern and South-Eastern Europe;

(b) Organizing workshops on advanced space applications and short- and medium-term training programmes;

(c) Strengthening its long-term fellowship programme to include support for the implementation of pilot projects;

(d) Promoting the participation of youth in space activities;

(e) Supporting or initiating pilot projects as follow-up to activities of the Programme in areas of priority interest to Member States;

(f) Providing technical advice, on request, to Member States, bodies and specialized agencies of the United Nations system and relevant national and international organizations;

(g) Enhancing access to space-related data and other information.

IV. Activities of the Programme

A. Support for disaster management

9. An analysis of major natural disasters occurring between 1950 and 1999 reveals a substantial increase in the occurrence of such disasters, particularly during the last decade of that period. In 1999 alone, there were more than 700 large-scale disasters, with losses totalling more than $100 billion. The impact of major disasters on national economies is particularly severe in developing countries, sometimes setting back the development of a country (or an entire region) several years.

10. Space technologies can play important roles in the reduction of disasters. The use of such technologies can be particularly useful in the risk assessment, mitigation and preparedness phases of disaster management. Space technologies are also vital to the early warning and management of the effects of disasters. It should be noted, however, that an operational disaster management support service that uses the capabilities of space systems requires the user organizations (those responsible for reducing disasters or for responding to them) to become familiar with the capabilities and limitations of the technologies.

11. Within the framework of the United Nations Programme on Space Applications, regional workshops have been organized on the use of space technology in disaster management, in particular for the benefit of developing countries. The objectives of the workshops are:

(a) To increase the awareness of managers and decision makers involved in disaster management of the potential benefits and the cost-effectiveness of using space technologies;

(b) To determine the types of information and communications needed in managing specific disasters and the extent to which they could be met by space technologies;

(c) To develop a plan of action that could lead in the near future to one or more pilot projects that

incorporate and test the use of space tools in disaster management.

12. The participants in the regional workshops have included: representatives of institutions involved in disaster reduction, civil protection and emergency response activities; representatives of international and regional organizations involved in supporting disaster management; representatives of space agencies with activities related to disaster management; and experts in remote sensing, satellite meteorology, satellite communications and positioning via satellites.

13. The first of the workshops was held under the auspices of the United Nations Programme on Space Applications for the benefit of countries in Latin America and the Caribbean in November 2000. A summary of the outcome of the workshop, which was held at La Serena, Chile, is contained in annex I. The full report of the workshop (A/AC.105/747) should contribute to the work of the Scientific and Technical Subcommittee as it addresses its three-year work plan on the implementation of an integrated, space-based global natural disaster management system.

B. Development of indigenous capability

14. The efforts of the United Nations Programme on Space Applications in developing indigenous capability have focused, in large part, on the establishment of regional centres for space science and technology education in developing countries and a Network of Space Science and Technology Education and Research Institutions for Central Eastern and South-Eastern Europe. The Programme continues to emphasize cooperation with Member States at the regional level aimed at establishing and supporting the centres and the network.

15. At its thirty-seventh session, in 2000, the Scientific and Technical Subcommittee endorsed the report of its Working Group of the Whole, which, among other things, had agreed that the regional centres should be invited to report to it, through the Office for Outer Space Affairs, on their accomplishments (A/AC.105/736, para. 33 and annex II, para. 35). In July 2000, the Office invited the regional centres and the Network to provide their reports, together with any relevant information regarding their main objectives and the programmes through which those objectives might be achieved. Information received by the Office on the activities conducted by the regional centres and the Network since their establishment, as well as their activities planned for 2001 and beyond, is contained in document A/AC.105/749.

C. Long-term fellowship programmes for in-depth training

16. Under the long-term fellowship programmes for in-depth training of the United Nations Programme on Space Applications, three fellowships for research in remote sensing technology tenable at the European Space Research Institute (ESRIN) facilities of the European Space Agency (ESA) in Frascati, Italy, for the year 2000, allowed university educators who had participated in the United Nations/Sweden series of courses to improve their skills. One educator from the University of Dakar and two educators from the Federal University of Technology, Minna, in Nigeria, completed a six-month training programme on the use of radar imagery in development applications. Upon completion of the training programme, through ad hoc arrangements, ESA provided the university educator from Senegal with a personal computer and software licences for Earth View (for radar interferometry) and ERDAS (for image processing) for teaching purposes. Similarly, ESA provided the educators from Nigeria with a personal computer and five ER Mapper software licences.

17. For the period 2001-2002, ESA has offered two fellowships in remote sensing technology tenable at the ESRIN facilities. For the same period, ESA has also offered three fellowships, each for a period of one year, at the European Space Research and Technology Centre at Noordwijk, Netherlands, for research and study in Communications Systems, in Space Antennas and Electromagnetics and in Remote Sensing Instrumentation.

D. Short-term training fellowships

18. The China National Space Administration, through the United Nations Programme on Space Applications and the Economic and Social Commission for Asia and the Pacific, offered seven one-month fellowship awards for training in space technology and applications within the framework of

the Asia-Pacific Multilateral Cooperation in Space Technology and Applications. The fellowship programme was tenable in Beijing, Harbin and Xi'an, China, from 22 July to 20 August 2000. Through the Programme, three of the fellowships were administered and the participation of researchers from Indonesia, Malaysia and Myanmar was sponsored.

E. Technical advisory services and promotion of regional cooperation

19. Various technical advisory services currently being provided, as well as activities that promote regional cooperation that are co-sponsored under the auspices of the United Nations Programme on Space Applications, are described below.

1. Follow-up activities of the United Nations/European Space Agency workshops on basic space science

20. Since 1991, when the series of United Nations/European Space Agency workshops on basic space science began, space scientists and engineers from 123 States from all regions have participated in and contributed to the workshops. The worldwide network of institutions collaborating through the workshops in the past decade has been supporting: (a) ground-based networks of small optical and radio telescopes and associated research and education programmes; and (b) a new concept for a multinational space-based astronomical satellite mission (World Space Observatory), particularly for the benefit of developing countries. Taking into account the achievements of past workshops, forthcoming workshops and their follow-up projects will address advanced space applications and new system developments for space scientists and engineers such as: (a) robotic telescopes; (b) distributed mission and science operations; (c) utilization of archives of satellite missions and data systems through the World Wide Web; and (d) the virtual observatory concept. The workshops will continue to strive to discover new ways and means of conducting basic space science around the world. The Ninth United Nations/European Space Agency Workshop on Basic Space Science, held in Toulouse, France, from 27 to 30 June 2000 (see annex I), chartered the course to be followed in the future for the implementation of the follow-up projects.

2. Asia-Pacific Satellite Communications Council

21. Since its establishment in 1994, with the assistance of the United Nations Programme on Space Applications, the Asia-Pacific Satellite Communications Council (APSCC) has grown considerably; it currently has 86 members from 28 countries. APSCC has played a key role in promoting the development of and cooperation in satellite communications in Asia and the Pacific by providing a platform for the exchange of views and ideas on new technologies, systems, policies and satellite communication services. Based in Seoul, APSCC organizes the Asia-Pacific Satellite Communication Conference and Exhibition for Global Communications on a biennial basis and has become a regional body for the satellite communications industry.

22. The United Nations Programme on Space Applications provided technical assistance in the preparations for the fifth Conference and Exhibition, entitled "A New Vision for Satellite Communication in the 21st Century", held in Seoul from 7 to 9 November 2000. The Conference addressed themes ranging from Internet and broadband systems to very small aperture terminal networks for rural communications and from mobile satellite services to launch systems and services. A representative of the Programme delivered the keynote address and participated in the discussions of the Conference. The Programme will continue to support the work of APSCC.

3. American Institute of Aeronautics and Astronautics

23. The Office for Outer Space Affairs will co-sponsor the sixth Workshop on International Space Cooperation, organized by the American Institute of Aeronautics and Astronautics under the theme "International Space Cooperation: Addressing Challenges of the New Millennium". The Office will contribute to the planning of the discussions to be held during the Workshop, which is to be held in Spain from 11-15 March 2001, and, through the Programme, will defray the costs of air travel and living expenses of a number of participants from developing countries. Recommendations emanating from the Workshop are expected to focus on future needs for the regulation of space traffic, Earth-threatening asteroids and comets, global navigation satellite systems, space and the public and on the contribution of space systems to the

implementation and verification of international environmental agreements.

4. XIX Plenary Meeting of the Sociedad de Especialistas Latinoamericanos en Percepción Remota

24. The XIX Plenary Meeting of the Sociedad de Especialistas Latinoamericanos en Percepción Remota (SELPER) and the IX Latin American Symposium on Remote Sensing was held at Puerto Iguazú, Argentina, from 6 to 10 November 2000. The objectives of the Meeting and the Symposium were to provide a forum in which members of the scientific and technical community involved in remote sensing and geographic information system applications could exchange results and update their knowledge of diverse applications of the technology and could promote links for cooperation among the participating institutions. The United Nations Programme on Space Applications defrayed the cost of registration fees or hotel accommodations for 20 experts who presented papers for discussion. The participants were from Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Peru, Uruguay and Venezuela.

5. Third Symposium of African Association of Remote Sensing of the Environment

25. The Third Symposium of African Association of Remote Sensing of the Environment and the 28th International Symposium on Remote Sensing of Environment were held in Cape Town, South Africa, from 27 to 31 March 2000. The theme of the Symposium was "Information for sustainable development". The main objective of the Symposium was to bring African environmental researchers, scientists and management experts together to share knowledge and to promote networking in the field of remote sensing for the environment. The United Nations Programme on Space Applications defrayed the cost of air travel, daily subsistence allowance and registration fees for three experts who presented papers for discussion. The participants were from Ghana, Malawi and Zambia.

6. Committee on Earth Observation Satellites

26. The 14th plenary meeting of the Committee on Earth Observation Satellites (CEOS) was held in Rio de Janeiro, Brazil, from 8 to 10 November 2000. During the meeting, a representative of the Office for Outer Space Affairs made a presentation on its plan of action and the action taken by the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee to implement the recommendations of UNISPACE III. The representative described actions taken under the United Nations Programme on Space Applications related to training and education for capacity-building and other action being undertaken or planned in areas of priority, such as disaster management.

27. At its 14th plenary meeting, CEOS welcomed the follow-up action being taken by the Office for Outer Space Affairs in pursuit of decisions taken at UNISPACE III and adopted a resolution in which it reaffirmed its intention to give full support to those actions, in particular through the work of its ad hoc Disaster Management Support Group and Working Group on Education and Training. The United Nations Programme on Space Applications, through its activities in 2000, contributed to the specific objectives of the Disaster Management Support Group, particularly by assisting developing countries in improving the identification of and access to Earth observation satellite data and products and in developing and identifying specific user requirements for satellite data, derived products and services in support of disaster management. The results of the United Nations/Chile/European Space Agency Workshop on the Use of Space Technology in Disaster Management, held in La Serena, Chile, from 13 to 17 November 2000, were provided to the Disaster Management Support Group. It was agreed that, in 2001, the Office for Outer Space Affairs would, together with the Indian Space Research Organization (ISRO), chair the ad hoc Working Group on Education and Training. The Office will provide an update on its plan of action to CEOS at its 15th plenary meeting.

7. Follow-up activities of training courses sponsored by the United Nations and the European Space Agency

28. The United Nations Programme on Space Applications continues to place emphasis on collaboration with the Department of Economic and Social Affairs of the Secretariat and ESA in implementing follow-up projects of the training courses on applications of data from the European remote sensing satellite (ERS) and other satellites to natural resources,

renewable energy and the environment that were held in Frascati, Italy, in 1993, 1994, 1995 and 1997. Preliminary results of the projects, which were initiated in 1999 in Latin America (Argentina, Bolivia and Chile) and in 2000 in Asia and the Pacific (Viet Nam), were presented at the ERS/ENVISAT symposium organized by ESA in Göteborg, Sweden, from 16 to 20 October 2000. The Programme also supported the participation of three researchers associated with the ongoing project in Viet Nam in the United Nations/European Space Agency/Committee on Space Research Workshop on Satellite Data Reduction and Analysis Techniques, held in Dehra Dun, India, from 27 to 30 November 2000. The project in Africa (Burkina Faso and the Regional Training Centre for Agrometeorology and Operational Hydrology and Their Applications (AGRHYMET)) is scheduled to begin in early 2001.

F. Training courses, workshops, conferences and symposia organized by the United Nations

1. Activities carried out in 2000

29. In 2000, six workshops, one training course and one symposium were conducted under the auspices of the United Nations Programme on Space Applications. A summary of each of the activities is given in annex I to the present report.

2. Activities scheduled for implementation in 2001

30. The training courses, workshops, meetings and symposia scheduled for 2001 are shown in annex II.

3. Activities proposed for implementation in 2002

31. The following activities are proposed for 2002:

(a) Twelfth United Nations/Sweden International Training Course on Remote Sensing Education for Educators, to be held in Stockholm and Kiruna, Sweden, in May-June 2002;

(b) Third United Nations/United States of America Workshop on the Use of Global Navigation Satellite Systems, for the benefit of developing countries in Latin America and the Caribbean;

(c) United Nations/European Space Agency Workshop on the Use of Space Technology in Disaster Management, for the benefit of developing countries in Asia and the Pacific;

(d) Fourth United Nations/United States of America Workshop on the Use of Global Navigation Satellite Systems, for the benefit of developing countries in Africa;

(e) United Nations/International Astronautical Federation Workshop on the Use of Space Technology for the Benefit of Developing Countries, to be held in Houston, United States of America, in September-October 2002;

(f) Eleventh United Nations/European Space Agency Workshop on Basic Space Science, for the benefit of developing countries in Latin America and the Caribbean, to be held in Brazil;

(g) Third United Nations/Austria Symposium on Enhancing the Participation of Youth in Space Activities, to be held in Graz, Austria, in September 2002;

(h) United Nations/United States of America International Meeting on the Use of Global Navigation Satellite Systems, for the benefit of developing countries in Africa;

(i) United Nations/European Space Agency Workshop on the Use of Space Technology in Disaster Management, for the benefit of countries in eastern Europe;

(j) Several workshops to be organized at the regional centres for space science and technology education, affiliated to the United Nations.

G. Space information

32. The twelfth in the series of documents containing selected papers from the activities of the Programme, entitled *Seminars of the United Nations Programme on Space Applications*, has been issued (ST/SPACE/5).

33. Information for Member States and the general public on the latest developments in the activities carried out under the United Nations Programme on Space Applications can be found on the home page of the Programme established on the Internet as part of the home page of the Office for Outer Space Affairs (http://www.unvienna.org/). It contains information on activities that have been implemented as well as

reports and press releases issued within the framework of the Programme. The schedules, objectives and programmes of planned activities and projects are also included on the home page.

V. Voluntary contributions

34. The successful implementation of the activities of the United Nations Programme on Space Applications in 2000 benefited from the support and voluntary contributions of the Member States and their institutions, as well as from the assistance and cooperation of regional and international governmental and non-governmental organizations. In 2000, the Programme received voluntary contributions, both in money and in kind, including the sponsorship of technical and scientific presentations by experts, as described below.

35. A number of Member States (Austria, Brazil, Chile, China, France, India, Malaysia and Sweden) and governmental and non-governmental organizations (the Austrian Space Agency, ESA, the Centre national d'études spatiales (CNES) of France, the Committee on Space Research (COSPAR), the German Space Agency (DLR), ISRO, the International Astronomical Union, the International Astronautical Federation, the National Aeronautics and Space Administration of the United States of America, the National Aerospace Laboratory (NLR) of the Netherlands, Stockholm University, the Swedish International Development Agency (Sida) and Satellus AB of the Swedish Space Corporation Group) provided support for the activities of the United Nations Programme on Space Applications in 2000 in various ways, including the following:

(a) A voluntary cash contribution of $22,000 from the Government of Austria, in support of the activities of the Programme;

(b) A financial contribution of $110,000 from ESA and 50,000 francs from CNES in support of specific activities of the Programme in 2000 that they co-sponsored (see annex I);

(c) Co-sponsorship of the activities of the Programme and, in particular, defrayal of the costs of international air travel of participants, local organization and facilities, room and board, and local transportation (see annex I);

(d) Sponsorship of experts by Member States and their space-related institutions, as well as by regional and international organizations, to make technical presentations and take part in deliberations during the activities of the Programme. The contributions are reflected in the individual reports of the activities in 2000 (see annex I).

VI. Financial provisions and administration of activities in the biennium 2000-2001

36. The activities of the United Nations Programme on Space Applications in 2001 covered in the present report will be implemented as follows:

(a) *Financial provisions*. Under the regular budget of the United Nations, an amount of $421,800 before recosting was approved in the programme budget by the General Assembly, at its fifty-fourth session, for implementing the activities of the Programme during the biennium 2000-2001. An amount of $210,900 before recosting from this budget will be used to implement the activities of the Programme in 2001. In order to effectively carry out its mandated and expanded activities, particularly those aimed at implementing the recommendations of UNISPACE III, the Programme must solicit additional funds, in the form of voluntary contributions, in support of its activities. Those contributions will be used to supplement the regular budget of the Programme;

(b) *Administration by and contributions and participation of staff*. The Office for Outer Space Affairs and, in particular, the Expert on Space Applications and his staff will carry out the activities described in the present report. In that connection, travel will be undertaken as appropriate by the Expert and the staff of the Office under the provisions of the travel budget of the Office for the biennium and as may be necessary from voluntary contributions.

Notes

[1] *Official Records of the General Assembly, Fifty-fifth Session, Supplement No. 20* (A/55/20), para. 71.

Annex I

Summary of United Nations training courses, workshops and conferences held in 2000

1. Tenth United Nations/Sweden International Training Course on Remote Sensing Education for Educators (Stockholm and Kiruna, Sweden, 2 May-9 June 2000)

Sponsoring country: Sweden

Sponsoring organization: United Nations

Host institutions: Stockholm University and Satellus AB of the Swedish Space Corporation Group

Funding support: Air travel and en route expenses for 13 participants were defrayed by the United Nations; all other expenses, including room and board and local travel, were covered by the Swedish International Development Agency.

Number of countries: 23

Total number of participants: 26

Outcome of the activity

The course was conducted specifically for the benefit of university educators from developing countries with the objective of developing their knowledge and skills in remote sensing technology and enabling them to introduce elements of the technology, as appropriate, in the academic curricula of their universities and institutes.

In order to evaluate the impact of the training courses in the period 1990-2000 on curriculum development and educational programmes at the local level, the Office for Outer Space Affairs of the Secretariat and Stockholm University initiated a global survey of former participants in this programme, as well as of their respective institutions and universities. Results of the survey will be transmitted to Satellus AB of the Swedish Space Corporation Group and to the Swedish International Development Agency and will be reported to the Committee on the Peaceful Uses of Outer Space.

(A detailed report on the training course is contained in document A/AC.105/741.)

2. Ninth United Nations/European Space Agency Workshop on Basic Space Science: Satellites and Networks of Telescopes—Tools for Global Participation in the Study of the Universe (Toulouse, France, 27-30 June 2000)

Sponsoring country: France

Sponsoring organizations: the United Nations, the European Space Agency (ESA), the Centre national d'études spatiales (CNES) of France, the German Space Agency (DLR), the National Aeronautics and Space Administration (NASA) of the United States of America, the Austrian Space Agency, the International Astronomical Union, the Committee on Space Research (COSPAR) and the National Astronomical Observatory of Japan

Host institutions: Ecole nationale supérieure de l'aéronautique et de l'espace, Université Paul Sabatier and Observatoire Midi-Pyrénées

Funding support: The United Nations, ESA and CNES provided the air travel and living expenses for participants from developing countries.

Number of countries: 34

Total number of participants: 80

Outcome of the activity

The workshop focused on three priority issues related to basic space science that are of regional and international interest:

(a) Projects for and results from optical astronomical telescope facilities in developing countries in all regions may be strengthened through a network approach. The participants of the workshop identified a need for practical exercises to network astronomical telescope facilities in terms of research and education programmes. That was exemplified by the Network of Oriental Robotic Telescopes, an activity pursued by French astronomers in developing countries;

(b) Past workshops in this series had recommended the consideration and evaluation of a world space observatory, possibly as a multinational astronomical satellite mission in the ultraviolet region of the electromagnetic spectrum. The results of a study to evaluate a World Space Observatory (WSO/UV) reference mission, carried out under the ESA General Studies Programme (Long-Term Planning), was presented to the workshop participants. The study showed the feasibility of a WSO/UV reference mission on a timescale of the order of six years. During the workshop, a videoconference took place with the Advanced Projects Design Team of the NASA Jet Propulsion Laboratory in Pasadena, United States of America, for the development of a satellite mission to planet Mars. Concurrent design methodology was used, with all mission design data shared between the Jet Propulsion Laboratory Team and the workshop participants. In the near future, a similar design session could be held for the World Space Observatory concept contained in the ESA internal study for WSO/UV;

(c) The use of databases of astronomical satellite missions and astrophysical data systems on the World Wide Web are crucial to future research and education programmes in developing countries. That was demonstrated at the workshop through examples of data available from satellite missions such as the Hubble Space Telescope, the joint ESA/NASA Solar and Heliospheric Observatory mission and the Mars Global Surveyor, as well as from data systems such as Astrophysics Data System, the Strasbourg Astronomical Data Centre (CDS) and the Los Alamos National Laboratory e-print archive. The need for training on how to access and utilize them in developing countries emerged from the discussion during the workshop. The workshop participants also addressed such issues as the virtual observatory concept and how it may change the way that astronomy is conducted around the world.

(A detailed report on the workshop is contained in document A/AC.105/742.)

3. United Nations/Austria/European Space Agency Symposium on Enhancing the Participation of Youth in Space Activities (Graz, Austria, 11-14 September 2000)

Sponsoring country: Austria

Sponsoring organizations: the United Nations and the European Space Agency

Host institution: Technical University of Graz

Funding support: Air travel and living expenses for 38 participants were covered by the United Nations, ESA and the Government of Austria.

Number of countries: 30

Total number of participants: 83

Outcome of the activity

Following the Third United Nations Conference on the Exploration and Peaceful Uses or Outer Space (UNISPACE III), some of the participants of the Space Generation Forum had formed an interim Youth Advisory Council to implement the recommendations of the Forum. The participants in the symposium, including several who had participated in the Forum, held additional organizational meetings during the symposium. At the closing of the symposium, the participants announced the removal of the interim status of the Youth Advisory Council and the formal constitution of the United Nations Programme on Space Applications Space Generation Advisory Council. The new Council is intended to give the young people of the world a forum for communication, a coordination mechanism and a voice in space issues. Members of six working groups of the Council identified issues of importance to youth and obstacles to their greater participation in space activities and began the task of identifying solutions to overcome the obstacles. The participants recommended that the Office for Outer Space Affairs, in the context of the follow-up to UNISPACE III, should continue to promote the involvement of young people in space activities. Specifically, support should continue for the Council and the series of symposia in the coming years.

(A detailed report on the symposium is contained in document A/AC.105/743.)

4. United Nations/International Astronautical Federation Workshop on an Operational Strategy for Sustainable Development Using Space (São José dos Campos, Brazil, 28-30 September 2000)

Sponsoring country: Brazil

Sponsoring organizations: the United Nations, the International Astronautical Federation (IAF), ESA and CNES

Host institution: National Institute for Space Research (INPE) of Brazil

Funding support: Air travel and living expenses for the period of the fifty-first International Astronautical Congress for 24 participants were covered by the United Nations, IAF, ESA and CNES. Room and board for those 24 participants during the workshop were defrayed by INPE.

Number of countries: 27

Total number of participants: 50

Outcome of the activity

An operational strategy that uses space technology to support sustainable development requires that the necessary funding be made available on a continuing basis. The need to create awareness of that fact at the decision-making level was strongly emphasized by the participants in the workshop. It was recommended that participating communities in developing countries should be encouraged to organize, on a regular basis, workshops and seminars with the objective of demonstrating to decision makers how economic productivity could be enhanced through the use of the technology. As operational sustainability required the continued interest of the end-users, it was recommended that databases and related technologies should be developed and implemented at the local (government or user) level. They should be made available to the user at no cost. To facilitate access to the software for the development of various applications, the establishment of regional software banks, accessible via the Internet, might be required. The need to involve local experts in projects sponsored internationally (by the World Bank or international development banks) was strongly emphasized. The participants recommended that presentations on the funding and financing of projects should be included in future workshops. Such presentations would improve the communication between scientists (or decision makers) at the local level and donor or funding agencies; they would also improve the awareness of scientists of the criteria applied by donor and funding agencies in the selection of projects.

The workshop participants were informed of the work conducted by the Office for Outer Space Affairs to further develop a comprehensive, Internet-based information repository for information on ongoing and planned projects, demonstrations of successful applications in different areas, activities of United Nations organizations and funding possibilities for education and training, as well as relevant public domain software. The work involved the establishment of an international implementation group that would begin working in 2001 using as a platform the "clubs" system of the National Aerospace Laboratory (NLR) of the Netherlands.

(A detailed report on the workshop is contained in document A/AC.105/744.)

5. United Nations/International Academy of Astronautics Workshop on Small Satellites at the Service of Developing Countries: the Latin American Experience (Rio de Janeiro, Brazil, 5 October 2000)

Sponsoring country: Brazil

Sponsoring organizations: the United Nations and the Subcommittee on Small Satellites for Developing Nations of the International Academy of Astronautics (IAA)

Funding support: The workshop was open to all participants of the fifty-first International Astronautical Congress; therefore, there was no additional funding required.

Total number of participants: approximately 50

Outcome of the activity

The workshop was organized within the framework of the fifty-first International Astronautical Congress. While the workshop was open to all participants of the Congress, the situation in Latin America was used as an example of the benefits of small satellites for developing countries. The workshop participants reviewed the advancements made in Latin America in the development and utilization of small satellites in the light of the recommendations made by previous workshops organized by the IAA Subcommittee on Small Satellites for Developing Nations. The workshops included one held in June 1994 in Brazil and a second one held within the framework of the Technical Forum of UNISPACE III.

The presentations at the workshop covered several projects finalized or under development in Argentina, Brazil, Chile, Mexico and Peru, demonstrating that Latin American experience in the field of small satellites had grown substantially since 1994, when the first workshop was held in Brazil.

The workshop participants identified the importance of interregional collaboration, especially the potential benefits of Africa having access to space systems developed, or similar to those developed, in Latin America. The workshop participants recommended that another workshop be organized to review the needs of African countries and the benefits that small satellite systems could bring to those countries in response to their needs.

(A detailed report on the workshop is contained in document A/AC.105/745.)

6. United Nations/Chile/European Space Agency Workshop on the Use of Space Technology in Disaster Management (La Serena, Chile, 13-17 November 2000)

Sponsoring country: Chile

Sponsoring organizations: the United Nations, ESA, the Intendencia de la IV Región de Coquimbo, the Feria Internacional del Aire y del Espacio, and the Centro de Estudios Aeronaúticos y del Espacio

Host institution: Universidad de La Serena

Funding support: Air travel and en route expenses for 22 participants were defrayed by the United Nations and ESA; the co-sponsors, including the Government of Chile, defrayed the expenses for room and board of 35 participants from developing countries.

Number of countries: 20

Total number of participants: 156

Outcome of the activity

The main objective of the workshop was to identify specific disaster themes where at least one institution involved in disaster management was interested, in principle, in initiating a pilot project to introduce the use of space technology in its work plans. Attending the workshop were participants from 16 countries in Latin America and the Caribbean, representing, among others, 31 institutions with activities in disaster management. The participants identified 16 disaster themes. For 13 of the 16 themes, at least one institution involved in disaster management was willing to become leader of a team that would develop a proposal for a pilot project. The specific disaster themes that were identified included: forest and grassland fires, earthquakes and tsunamis, volcanic eruptions, flooding, cyclones, droughts, landslides, impact on marine and coastal systems, and oil spills. Because of the high level of interest of the participating institutions and the fact that institutions outside the region of Latin America and the Caribbean had shown an interest in participating in some of the pilot project teams, two or three pilot projects were expected to be undertaken in the near term.

In view of the participation of the CEOS ad hoc Disaster Management Support Group of the Committee on Earth Observation Satellites (CEOS) and the secretariat for the International Strategy for Disaster Reduction, it is possible that one or more of the pilot projects resulting from the workshop could be used to develop scenarios for the response of space agencies to specific disasters. Such action would increase the visibility of those projects for all the CEOS agencies and thus the likelihood of their support for them. The report on the workshop will also contribute to the work of the Scientific and Technical Subcommittee as it addresses its three-year work plan on the implementation of an integrated, space-based global natural disaster management system.

(A detailed report on the workshop is contained in document A/AC.105/747.)

7. United Nations/Malaysia Workshop on Bridging the Digital Divide: Space Technology Solutions (Kuala Lumpur, 20-24 November 2000)

Sponsoring country: Malaysia

Sponsoring organization: United Nations

Host institution: the Ministry of Science, Technology and the Environment of Malaysia

Funding support: The United Nations covered the cost of air travel and hotel accommodations of 14 participants. The Government of Malaysia, through the Space Science Studies Division of the Ministry of Science, Technology and the Environment, provided board for all participants.

Number of countries: 19

Total number of participants: 80

Outcome of the activity

During the workshop, participants from various governmental institutions and private industry from developed and developing countries were briefed on the latest developments in satellite solutions to accessing or providing Internet services. The objective of the workshop was to familiarize participants in decision-making positions in institutions in Asia and the Pacific with practical and cost-effective space-based solutions for applications such as distance education and telemedicine. The participants noted that the main advantage of educational broadcasting via satellite and two-way interactive e-learning, particularly for areas with underdeveloped telecommunications infrastructure, was the capability of satellite systems to provide wide distribution of educational programmes to large numbers of students or professionals.

(A detailed report on the workshop is contained in document A/AC.105/748.)

8. Third United Nations/European Space Agency/Committee on Space Research Workshop on Satellite Data Reduction and Analysis Techniques (Dehra Dun, India, 27-30 November 2000)

Sponsoring country: India

Sponsoring organizations: the United Nations, ESA and COSPAR

Host institutions: the Indian Space Research Organization (ISRO), the Indian Institute of Remote Sensing and the Centre for Space Science and Technology Education in Asia and the Pacific

Funding support: Air travel and en route expenses for 16 participants were defrayed by the United Nations; all other expenses, including room and board and local travel, were covered by the Government of India through ISRO.

Number of countries: 23

Total number of participants: 59

Outcome of the activity

The workshop provided a forum for educators and scientists from developing countries concerned with access to and analysis and interpretation of satellite data. It was stated that, while the scientific applications of satellite data covered a wide range of topics, ranging from environmental monitoring to astronomy and from meteorology to remote sensing, the basic techniques of satellite data processing and the software needed for that purpose would essentially be common to those activities.

Presentations made at the workshop covered satellite data reduction and analysis and image processing techniques as applied in the fields of remote sensing, meteorology and space science. Information on satellite data access, interpretation and archiving was presented at the workshop as well, along with a demonstration of appropriate software tools. The workshop fostered communication between users with a wide range of expertise in the application of software packages for data management in remote sensing. The workshop also provided an opportunity to begin preparations for the fourth workshop in the series, to be hosted by the Government of the Syrian Arab Republic in 2001.

(A detailed report on the workshop is contained in document A/AC.105/746.)

Annex II

United Nations Programme on Space Applications: schedule of training courses, workshops, conferences and symposia for implementation in 2001

Activity	*Title*	*Place (and date)*	*Objective*
1	United Nations/European Space Agency/Committee on Space Research Workshop on Data Analysis Techniques	Damascus (25–29 March 2001)	To promote data analysis techniques in space-related applications; for countries in western Asia
2	Eleventh United Nations/Sweden International Training Course on Remote Sensing Education for Educators	Stockholm and Kiruna, Sweden (2 May-9 June 2001)	To enable university professors from developing countries in all regions to include remote sensing in their curricula
3	Tenth United Nations/European Space Agency Workshop on Basic Space Science	Reduit, Mauritius (25-29 June 2001)	To review follow-up activities of previous workshops in this series and decide on further action; for countries in Africa
4	United Nations/European Space Agency Workshop on Remote Sensing for Environmental Monitoring and Natural Resource Management	Prague (2–5 July 2001)	To improve decision-making in development activities while protecting the environment; for countries in eastern Europe
5	Second United Nations/Austria Symposium on Enhancing the Participation of Youth in Space Activities	Graz, Austria (September 2001)	To review follow-up activities of the first symposium in this series, held in Graz in September 2000, and to decide on new action; for the benefit of young people from all regions
6	United Nations/International Astronautical Federation Workshop on the Use of Space Technology for the Benefit of Developing Countries	Toulouse, France (September-October 2001)	To review follow-up activities of previous workshops in this series and decide on new action; for all regions
7	United Nations/International Academy of Astronautics Workshop on Small Satellites at the Service of Developing Countries: the African Perspective	Toulouse, France (one day during the International Astronautical Congress in October 2001)	To review the potential benefits that small satellite systems could bring to African countries and possibilities for interregional cooperation
8	United Nations Training Course on the Use of the International Search and Rescue Satellite System	Bangalore, India (first half of 2001)	To promote the use of the International Search and Rescue Satellite System (COSPAS-SARSAT); for countries in Asia and the Pacific

Activity	*Title*	*Place (and date)*	*Objective*
9	United Nations/European Space Agency Workshop on the Use of Space Technology in Disaster Management	Beirut (second half of 2001)	To identify disasters of concern to Africa and western Asia and to identify possible pilot projects that use space technology
10	United Nations/United States of America/International Society for Photogrammetry and Remote Sensing Workshop on the Use of Global Navigation Satellite Systems	Vienna (second half of 2001)	To promote the use of global navigation and positioning satellite systems in development activities; for countries in eastern Europe
11	United Nations/United States of America Workshop on the Use of Global Navigation Satellite Systems	Kuala Lumpur (second half of 2001)	To promote the use of global navigation and positioning satellite systems in development activities; for countries in Asia and the Pacific
12	United Nations Workshop on the Use of Earth Observation as an Instrument for Solving Development Problems in Sub-Saharan Africa	Southern Africa (second half of 2001)	To appraise high-level decision makers of the use of space technology in development activities; for countries in Africa
13	United Nations Expert Meeting on the Regional Centres for Space Science and Technology Education: Status and Future Development	Frascati, Italy (second half of 2001)	To update the curricula of the regional centres; for space science and technology education; for all regions